



# California Regional Water Quality Control Board Los Angeles Region

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Agency Secretary

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SPECIAL HEARING


2/3/05

cc: BD, DI, DWQ

E-cys: BD, CC HMS, TH, CMW

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**TO:** Bruce Fujimoto  
Division of Water Quality, State Board

**FROM:**   
Xavier Swamikannu, D.Env.  
Storm Water Program

**DATE:** January 31, 2005

**SUBJECT: TRANSMITTAL OF (i) FINAL REPORT: INDUSTRIAL STORM WATER MONITORING, AND (ii) RESEARCH PAPER, FOR INCLUSION IN THE ADMINISTRATIVE RECORD FOR THE INDUSTRIAL GENERAL PERMIT**

Please find enclosed the following two documents, (i) *Final Report: Industrial Storm Water Monitoring Program – Existing Statewide Permit Utility and Proposed Modifications, Stenstrom and Lee (2005)*, and (ii) *Utility of Stormwater Monitoring, Lee and Stenstrom, Water Environment Research, Vol. 77(1) (2005)*. The *Final Report: Industrial Storm Water Monitoring Program – Existing Statewide Permit Utility and Proposed Modifications*, was prepared pursuant to State Board Contract No. 02-172-140-0.

These documents will be of assistance to you and support changes to the Draft Industrial General Permit to improve its monitoring program to better assess the quality of storm water discharges, to collect data for Total Maximum Daily Load (TMDL) development, and to assess compliance. I request that they be included in the Administrative Record for the Industrial General Permit.

Attachments

**California Environmental Protection Agency**



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Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations

# Utility of Stormwater Monitoring

Haejin Lee, Michael K. Stenstrom

**ABSTRACT:** Stormwater runoff is now a major contributor to the pollution of coastal waters in the United States. Public agencies are responding by requiring stormwater monitoring to satisfy the National Pollutant Discharge Elimination System stormwater permit. However, studies to understand the utility of the current programs or to improve their usefulness have not yet been performed. In this paper, we evaluate the land-use-based program, the industrial stormwater permit program, and beach water-quality monitoring in the County of Los Angeles, California, to determine if the results will be helpful to planners and regulators in abating stormwater pollution. The utility of the program has been assessed based on the programs' ability to accurately estimate the emissions for different classes of land use. The land-use program appears successful, while the industrial monitoring program does not. Beach water-quality monitoring suffers from a lack of real-time monitoring techniques. We also provide suggested improvements, such as sampling method and time, and parameter selection. *Water Environ. Res.*, 77, 000 (2005).

**KEYWORDS:** stormwater, monitoring, neural network, land use, coastal water.

## Introduction

California coastal waters are important recreational and economic resources, which make the safety of coastal waters of concern to both state and county health departments and beachgoers (Jiang et al., 2001). The completion of wastewater treatment plants mandated by the Clean Water Act has reduced conventional water pollution to California's beaches and bays. As a result, non-point-source pollution, such as stormwater runoff, is now a major contributor to the pollution of the coastal water, including Santa Monica Bay, which is among the most severely polluted bays in the United States (Wong et al., 1997). The problem of stormwater pollution is becoming worse because of population growth, which results in increased impermeable area. Storm drains entering the ocean are a main cause of permanent beach postings at many California beaches (State Water Resources Control Board, 2001).

Public agencies are responding by requiring stormwater monitoring to satisfy the National Pollutant Discharge Elimination System (NPDES) stormwater permit as authorized by the Clean Water Act. For example, the Los Angeles County Department of Public Works (LACDPW) has been monitoring stormwater under the 1990 NPDES municipal permit (No. CA0061654), and later the 1996 municipal permit (No. CAS614001), since the 1994–1995 wet season. Additional sampling is required by other agencies, such as the City of Los Angeles and the California Department of Transportation. Similar programs are underway in other areas of California and the United States.

The existence of stormwater-monitoring programs should represent progress towards achieving clean-water goals; however, studies have not yet been performed to understand the utility of the current programs or to improve their usefulness. In this paper, we evaluate several monitoring programs to determine if the results will be helpful to planners and regulators in abating stormwater pollution.

Datasets from a major municipal program, beach monitoring, a large self-monitoring program, and a research project were used. The results suggest that parts of the current monitoring programs will not be helpful to regulators and planners, and we make proposals for improvement, along with projected cost increases.

## Background

The LACDPW has been monitoring stormwater since the early 1970s. In 1994, it began an improved program, which was designed to determine total pollutant emissions to Santa Monica Bay and determine land-use-specific discharges (Stenstrom and Strecker, 1993). Total emissions are estimated from flow-weighted composite samples that are collected at five sampling stations (four stations are required under the 1996 permit and one station remains from an earlier permit.). These stations are "mass emission" stations in that they were selected to sample the greatest runoff mass with the least number of stations. The stations are equipped with flow-monitoring equipment and operate unattended in secure facilities. Samples from specific land uses are also required by the 1996 municipal permit and are collected with composite samplers at engineered sampling stations. A large suite of water-quality parameters is measured, including indicator organisms, general minerals, nutrients, metals, semivolatile organic compounds, and pesticides.

Additional monitoring is being conducted by other agencies to satisfy regulations or for research. The California Department of Transportation (Caltrans) has a large monitoring program for their highways. Our laboratory has monitored three highway locations near the University of California at Los Angeles (UCLA) (adjacent to the 101 and 405 freeways) since 1999 (Stenstrom et al., 2000 and 2001). The study is also sponsored by Caltrans, and an extensive suite of parameters is measured, including indicator bacteria, general minerals, nutrients, metals, polycyclic aromatic hydrocarbons, and oil and grease.

The previous programs monitor discharges to the bay, but there are also programs that monitor coastal waters. The California Assembly passed Bill 411 (chapter 765 of Statutes of 1997; [http://www.swrcb.ca.gov/beach/bills/ab\\_411\\_bill\\_19971008\\_chaptered.pdf](http://www.swrcb.ca.gov/beach/bills/ab_411_bill_19971008_chaptered.pdf)) to address the problem of declining beach water quality and restore confidence in beach swimming. Three types of indicators organisms are monitored, and retesting in the event of an exceedence is also required. The more restrictive procedures by the bill have increased the frequency of beach postings and closures. The closure of Huntington Beach in Orange County, California, during the summer of 1999, was the first example of beach closures caused by the new regulations (Grant et al., 2001; Orange County Sanitation District, 1999). Many organizations are monitoring the microbiological water quality of Southern California coastal waters (Noble et al., 2000).

An example of a new monitoring activity is the Industrial Activities Stormwater General Permit, which mandates all industrial stormwater